

REMARKS

In the Office Action the Examiner noted that claims 1-4, 7 and 14 are pending in the application and the Examiner rejected all claims. By this Amendment, various claims have been amended. Thus, claims 1-4, 7 and 14 remain pending in the application. The Examiner's rejections are traversed below.

Rejection Under 35 U.S.C. § 112

In items 1 and 2 on page 2 of the Office Action the Examiner rejected claim 14 under 35 U.S.C. § 112 second paragraph, as indefinite. In particular, the Examiner took the position that the term "increased" was indefinite. By this Amendment, claim 14 has been amended to clarify the features of the present invention. Therefore, it is submitted that claim 14, as amended, meets the requirements of 35 U.S.C. § 112.

Rejection of Claims 1 and 3-7

In items 4-19 on pages 2-6 of the Office Action the Examiner rejected claims 1 and 3-7 under 35 U.S.C. § 103 as unpatentable over U.S. Patent 5,167,444 to Hall in view of the publication entitled "Temperature Independent Interferometer for WDM Filters" by Shirasaki.

U.S. Patent 5,167,444 to Hall

The Hall patent is directed to an apparatus and method for optical signal source stabilization. Figure 2 of Hall illustrates an interferometer 20 having three discs 36, 37 and 38 and a ring 40 formed of a material having a low coefficient of thermal expansion. The three discs 36, 37 and 38 as well as the ring 40 are formed of a glass ceramic composite material. The glass ceramic material includes a first component having a positive coefficient of thermal expansion and a second component having a negative coefficient of thermal expansion (column 4, lines 31-48).

Hall discloses stabilizing a frequency of an optical signal output from an optical signal source by polarizing the optical signal output from the optical signal source to direct the polarized optical signal to a Fabry-Perot interferometer, and controlling the optical signal source so that light selected after transmitting through the Fabry-Perot interferometer is maintained.

The Shirasaki Publication

The Shirasaki publication is directed to a method for eliminating the temperature dependence of an interferometer such as a Fabry-Perot etalon. Referring to Figure 3, Shirasaki discloses that temperature dependence of an optical distance is reduced by forming the interferometer such that a thin glass plate having anti-reflection coatings is sandwiched between thick glass plates having larger thermal expansion coefficients than the thin glass plate. The Shirasaki publication appears to be related to cited U.S. Patent 5,982,488 to Shirasaki.

The Present Claimed Invention Patentably Distinguishes over the Prior Art

The purpose of the Hall patent and the Shirasaki publication is to reduce the temperature dependency of the transmission wavelength characteristic of a Fabry-Perot interferometer.

In the Amendment filed in response to the prior Office Action the applicants urged that the present invention is directed not only to reducing but also to increasing the temperature dependency of the transmission wavelength characteristic. In particular, the applicants urged that in the present invention, by setting the thicknesses and coefficients of expansion of the claimed first and second parallel members appropriately, it is possible to flexibly address (i.e., increase or decrease) the temperature dependency of the transmission wavelength characteristic of the etalon.

In item 26 on page 8 of the current Office Action, the Examiner takes the position that whether the prior art teaches "reduction or otherwise is not relevant to claim 1, since the further argumentation that the applicant encompasses reducing and increasing temperature dependency is not claimed."

With regard to claim 1, the Examiner takes the position that in Figure 2 and column 4, lines 31-68, Hall teaches that a distance between parallel flat surfaces and expansion coefficients thereof are set so as to obtain a temperature dependency of transmission wavelength characteristic capable of compensating a wavelength temperature dependency of incident light (item 6 of the Office Action).

It is submitted that the Examiner's position that Hall is capable of compensating a

temperature dependency of incident light is inaccurate. In particular, in Hall the thickness and thermal expansion coefficient of each member of the etalon are set so that a change of transmission wavelength characteristic with respect to a temperature fluctuation, is extremely small. As a result, since a transmission wavelength characteristic is hardly varied in response to a temperature fluctuation in the etalon of Hall, it is difficult to compensate for a temperature dependency of incident light, when incident light having a great temperature dependency is provided to the etalon.

In contrast to the prior art, in the etalon of the present invention, since the thickness and thermal expansion coefficient of each member is set so that the temperature dependency of a transmission wavelength characteristic is made greater, it is possible to compensate for the wavelength temperature dependency of incident light.

Referring specifically to claim 1, it is submitted that the prior art does teach or suggest:

“wherein a Fabry-Perot interferometer is formed based on an airgap positioned between the flat surface of said first parallel member and the flat surface of said transparent member facing each other, and wherein a distance between the parallel flat surfaces and the expansion coefficient of each of said first and second parallel members, are set to obtain temperature dependency of a transmission wavelength characteristic which is greater than a predetermined value, so that a wavelength temperature dependency of wavelength characteristic of incident light is capable of being compensated.”

Therefore, it is submitted that claim 1 patentably distinguishes over the prior art.

Claims 2-3 and 7 depend from claim 1 and include all of the features of claim 1 plus additional features which are not taught or suggested by the prior art. Therefore, it is submitted that claims 2-3 and 7 patentably distinguish over the prior art.

Rejection of Claim 2

In items 20-25 on pages 6-8 of the Office Action the Examiner has rejected claim 2 under 35 U.S.C. § 103 as unpatentable over the Hall patent in view of the Shirasaki publication and further in view of U.S. Patent 5,982,488 to Shirasaki.

Claim 2 depends from claim 1 and includes all of the features of that claim, plus additional features which are not taught or suggested by the prior art. Therefore, it is submitted that claim 2 patentably distinguishes over the prior art.

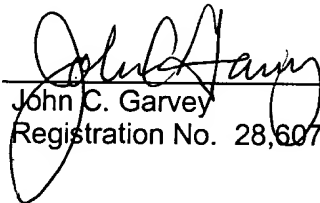
Summary

It is submitted that none of the references either taken alone or in combination teach the present claimed invention. Thus, claims 1-4, 7 and 14 are deemed to be in condition for allowance. Reconsideration of the claims and an early notice of allowance are earnestly solicited.

Respectfully submitted,

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